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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/516,625	03/18/2005	Akifumi Miyano	37249	5420

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EXAMINER	
LE, HIEN	
ART UNIT	PAPER NUMBER
3662	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	12/22/2006	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/516,625	MIYANO ET AL.	
	Examiner	**Art Unit**	
	Hien Le	3662	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *18 March 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-12* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-12* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *24 January 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *01/04/2005 and 05/15/2006*.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Specification

The following guidelines illustrate the preferred layout for the specification of a utility application. These guidelines are suggested for the applicant's use.

Arrangement of the Specification

As provided in 37 CFR 1.77(b), the specification of a utility application should include the following sections in order. Each of the lettered items should appear in upper case, without underlining or bold type, as a section heading. If no text follows the section heading, the phrase "Not Applicable" should follow the section heading:

(a) TITLE OF THE INVENTION.
(b) CROSS-REFERENCE TO RELATED APPLICATIONS.
(c) STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT.
(d) THE NAMES OF THE PARTIES TO A JOINT RESEARCH AGREEMENT.
(e) INCORPORATION-BY-REFERENCE OF MATERIAL SUBMITTED ON A COMPACT DISC.
(f) BACKGROUND OF THE INVENTION.
  (1) Field of the Invention.
  (2) Description of Related Art including information disclosed under 37 CFR 1.97 and 1.98.
(g) BRIEF SUMMARY OF THE INVENTION.
(h) BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING(S).
(i) DETAILED DESCRIPTION OF THE INVENTION.
(j) CLAIM OR CLAIMS (commencing on a separate sheet).
(k) ABSTRACT OF THE DISCLOSURE (commencing on a separate sheet).
(l) SEQUENCE LISTING (See MPEP § 2424 and 37 CFR 1.821-1.825. A "Sequence Listing" is required on paper if the application discloses a nucleotide or amino acid sequence as defined in 37 CFR 1.821(a) and if the required "Sequence Listing" is not submitted as an electronic document on compact disc).

The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is

requested in correcting any errors of which applicant may become aware in the specification.

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

2. Claim **12** is rejected under 35 U.S.C. 102(a) as being unpatentable by **Loomis (U.S. patent # 6,225,945).**

Considering **claim 12**, Loomis discloses the limitations of the GPS receiver, comprising:

- A receiving portion, receiving navigation messages transmitted from a plurality of GPS satellites respectively. " A GPS receiver having a fast time to first fix by comprising measure range rates for GPS satellites to GPSA satellites" (abstract).
- A navigation message analyzing portion, obtaining an ephemeris. " A GPS receiver of the present invention operates in a conventional manner for determining location by using the ephemeris data for determining pseudo ranges and using pseudo range for calculating location" (column 3, line 21-25).

It is well known to one skill in the art that the GPS receiver certainly has a navigation message analyzing portion to use the ephemeris data for determining pseudo ranges and using pseudo range for calculating location. Therefore, Loomis explicitly discloses the limitations above.

- An almanac from the received navigation message to restore. " When current ephemeris data is not available, the GPS receiver uses GPS almanac data or old GPS ephemeris data, herein termed coarse satellite orbital parameters, for determining a user velocity and then integrating the user velocity from the last known location to obtain a first new location" (column 3, line 25-30).
- An ephemeris storing portion, storing the obtained ephemeris and an almanac storing portion, storing the restored almanac." The GPS navigation processing code 36 uses information in the GPS data bits for updating and storing the GPS ephemeris orbital parameters in the memory 20 as current GPS ephemeris data 42 and the GPS satellite almanac orbital parameters in the memory 20 as GPS almanac data 44" (column 5, line 56-61).
- A clock portion, measuring a time to calculate a current time. " The real time clock 40" (FIG. 1., column 5, line 45).
- A satellite position calculating portion, calculating positions of the plurality of GPS satellites by using the current time calculated in the clock portion and the obtained ephemeris or the restored almanac. " When the GPS ephemeris data 42 is current, the GPS navigation processing code 36 uses the GPS ephemeris data 42" (column 6, line 10-13), " when the GPS ephemeris data

42 is no longer current, the memory 20 includes program codes for data selector 51,.., and a user location integrator 62 for calculating a first location fix. The data selector 51 selects stored coarse GPS orbital parameters for either the GPS almanac data 44 or the old GPS ephemeris data 45" (column 6, line 23-35).

- A position measuring portion, calculating a position measuring based on the navigation message transmitted from the GPS satellite as communication object, wherein the almanac is formed on the basis of the obtained ephemeris." When current ephemeris information is available a GPS receiver of the present invention operates in a conventional manner for determining location by using the ephemeris data for determining pseudo ranges and using the pseudo range for calculating location. When current ephemeris data is not available, the GPS receivers uses GPS almanac data or old GPS ephemeris data, herein termed coarse satellite orbital parameters, for determining a user velocity and then integrating the user velocity form the last known location to obtain first new location" (column 3, line 20-30).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims **1-2 and 11** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Loomis (U.S. patent # 6,225,945), in view of Gaal (U.S. Patent # 2002/0049536).**

Considering **claim 1**, Loomis discloses the limitations of the GPS receiver, comprising:

- A receiving portion, receiving navigation messages transmitted from a plurality of GPS satellites respectively. " A GPS receiver having a fast time to first fix by comprising measure range rates for GPS satellites to GPSA satellites" (abstract).
- A navigation message analyzing portion, obtaining an ephemeris. " A GPS receiver of the present invention operates in a conventional manner for determining location by using the ephemeris data for determining pseudo ranges and using pseudo range for calculating location" (column 3, line 21-25).

It is well known to one skill in the art that the GPS receiver certainly has a navigation message analyzing portion to use the ephemeris data for determining pseudo ranges and using pseudo range for calculating location. Therefore, Loomis explicitly discloses the limitations above.

- An almanac from the received navigation message to restore. " When current ephemeris data is not available, the GPS receiver uses GPS almanac data or old GPS ephemeris data, herein termed coarse satellite orbital parameters,

for determining a user velocity and then integrating the user velocity from the last known location to obtain a first new location" (column 3, line 25-30).

- An ephemeris storing portion, storing the obtained ephemeris and an almanac storing portion, storing the restored almanac." The GPS navigation processing code 36 uses information in the GPS data bits for updating and storing the GPS ephemeris orbital parameters in the memory 20 as current GPS ephemeris data 42 and the GPS satellite almanac orbital parameters in the memory 20 as GPS almanac data 44" (column 5, line 56-61).
- A clock portion, measuring a time to calculate a current time. " The real time clock 40" (FIG. 1., column 5, line 45).
- A satellite position calculating portion, calculating positions of the plurality of GPS satellites by using the current time calculated in the clock portion and the obtained ephemeris or the restored almanac. " When the GPS ephemeris data 42 is current, the GPS navigation processing code 36 uses the GPS ephemeris data 42" (column 6, line 10-13), " when the GPS ephemeris data 42 is no longer current, the memory 20 includes program codes for data selector 51,.., and a user location integrator 62 for calculating a first location fix. The data selector 51 selects stored coarse GPS orbital parameters for either the GPS almanac data 44 or the old GPS ephemeris data 45" (column 6, line 23-35).
- A position measuring portion, calculating a position measuring based on the navigation message transmitted from the GPS satellite as communication

> object." When current ephemeris information is available a GPS receiver of the present invention operates in a conventional manner for determining location by using the ephemeris data for determining pseudo ranges and using the pseudo range for calculating location. When current ephemeris data is not available, the GPS receivers uses GPS almanac data or old GPS ephemeris data, herein termed coarse satellite orbital parameters, for determining a user velocity and then integrating the user velocity form the last known location to obtain first new location" (column 3, line 20-30).

Loomis fails to disclose the limitation of a GPS receiver, wherein the navigation message analyzing portion includes a predicting portion which predicts a time information stored only in a final subframe, which serves as a reference to calculate positions of the plurality of GPS satellites, based on information indicating a lapsed week number on a basis of a predetermined week stored in each main frame of the received navigation message respectively, and a restoring portion which restores the almanac based on the predicted time information which serves as the-reference to calculate the positions of the plurality of GPS satellites.

However, Gaal successfully discloses the limitations of the navigation message analyzing portion including a predicting portion which predicts a time information stored only in a final subframe, which serves as a reference to calculate positions of the plurality of GPS satellites, based on information indicating a lapsed week number on a basis of a predetermined week stored in each main frame of the received navigation message respectively, and a restoring portion which restores the almanac based on the

predicted time information which serves as the-reference to calculate the positions of the plurality of GPS satellites. " The process proceeded to determine whether the old TOW and the last almanac update time are the same, then the process will reset the almanac update table as shown in step 616" (column 8, paragraph 0123).

Therefore, it would have obvious to one skill in the art that the almanac data in the reference predicts the next super frame to wait for 12.5 minutes before the first prediction for a SV is available which means a time information stored only in a final subframe. Furthermore, the process in the reference proceed to determine TOW which also means the predicting time information indicating a lapsed week number on a basis of a predetermined week stored in each main frame of the received navigation message respectively.

Doing so would motivate the limitations of GPS receiver including a predicting portion which predicts a time information stored only in a final subframe, which serves as a reference to calculate positions of the plurality of GPS satellites, based on information indicating a lapsed week number on a basis of a predetermined week stored in each main frame of the received navigation message respectively, and a restoring portion which restores the almanac based on the predicted time information which serves as the-reference to calculate the positions of the plurality of GPS satellites.

Considering **claim 2**, Loomis discloses the limitations of the GPS receiver, comprising:

- A receiving portion, receiving navigation messages transmitted from a plurality of GPS satellites respectively. " A GPS receiver having a fast time to

first fix by comprising measure range rates for GPS satellites to GPSA satellites" (abstract).

- A navigation message analyzing portion, obtaining an ephemeris. " A GPS receiver of the present invention operates in a conventional manner for determining location by using the ephemeris data for determining pseudo ranges and using pseudo range for calculating location" (column 3, line 21-25).

It is well known to one skill in the art that the GPS receiver certainly has a navigation message analyzing portion to use the ephemeris data for determining pseudo ranges and using pseudo range for calculating location. Therefore, Loomis explicitly discloses the limitations above.

- An almanac from the received navigation message to restore. " When current ephemeris data is not available, the GPS receiver uses GPS almanac data or old GPS ephemeris data, herein termed coarse satellite orbital parameters, for determining a user velocity and then integrating the user velocity from the last known location to obtain a first new location" (column 3, line 25-30).
- An ephemeris storing portion, storing the obtained ephemeris and an almanac storing portion, storing the restored almanac." The GPS navigation processing code 36 uses information in the GPS data bits for updating and storing the GPS ephemeris orbital parameters in the memory 20 as current GPS ephemeris data 42 and the GPS satellite almanac orbital parameters in the memory 20 as GPS almanac data 44" (column 5, line 56-61).

- A clock portion, measuring a time to calculate a current time. " The real time clock 40" (FIG. 1., column 5, line 45).
- A satellite position calculating portion, calculating positions of the plurality of GPS satellites by using the current time calculated in the clock portion and the obtained ephemeris or the restored almanac. " When the GPS ephemeris data 42 is current, the GPS navigation processing code 36 uses the GPS ephemeris data 42" (column 6, line 10-13), " when the GPS ephemeris data 42 is no longer current, the memory 20 includes program codes for data selector 51,.., and a user location integrator 62 for calculating a first location fix. The data selector 51 selects stored coarse GPS orbital parameters for either the GPS almanac data 44 or the old GPS ephemeris data 45" (column 6, line 23-35).

Loomis fails to disclose the limitation of a GPS receiver, wherein the navigation message analyzing portion includes a predicting portion which predicts a time information stored only in a final subframe, which serves as a reference to calculate positions of the plurality of GPS satellites, based on the current time which is calculated in the clock portion, and a restoring portion which restores the almanac based on the predicted time information which serves as the-reference to calculate the positions of the plurality of GPS satellites.

However, Gaal successfully discloses the limitations of the navigation message analyzing portion including a predicting portion which predicts a time information stored only in a final subframe, which serves as a reference to calculate positions of the

plurality of GPS satellites, based on the current time which is calculated in the clock portion, and a restoring portion which restores the almanac based on the predicted time information which serves as the-reference to calculate the positions of the plurality of GPS satellites. " Subframe 1 contains clock corrections and the health information relating to the transmitting SV, and subframe two and three contain precise orbital data sets for the transmitting SV" (column 3, paragraph 0082).

Therefore, it would have obvious to one skill in the art that the almanac data in the reference predicts the next super frame to wait for 12.5 minutes before the first prediction for a SV is available which means a time information stored only in a final subframe.

Doing so would motivate the limitations of GPS receiver including a predicting portion which predicts a time information stored only in a final subframe, which serves as a reference to calculate positions of the plurality of GPS satellites, based on the current time which is calculated in the clock portion, and a restoring portion which restores the almanac based on the predicted time information which serves as the-reference to calculate the positions of the plurality of GPS satellites.

Considering **claim 11**, respected to **claim 1**, Loomis fails to disclose the limitations of the time information indicating the second number lapsed from a head of a week stored in a subframe, in which the almanac is stored, of respective main frames of the navigation message.

However, Gaal successfully discloses the limitations of the time information indicating the second number lapsed from a head of a week stored in a subframe, in

which the almanac is stored, of respective main frames of the navigation message. " The value of the TOW as received is saved in task P710. Next, the process determines whether the subframe was an almanac subframe in task P720. If the received subframe is an almanac subframe, then the loop increment value is set to 125 in task P730. If the received subframe is not an almanac subframe, then the loop increment value is set to 5 in task P740" (column 7, paragraph 0120).

Therefore, it would have been obvious to one skill in the art that the second number lapsed from a head of a week is stored in a subframe because the loop increment value in the reference is set upon the determination of almanac subframes and the received value of the TOW.

Doing so would motivate the limitations of the time information indicating the second number lapsed from a head of a week stored in a subframe, in which the almanac is stored, of respective main frames of the navigation message.

Loomis also fail to disclose the previously predicted WNa used as the time information with respect to the almanac which contains the time information indicating the second number lapsed from the head of a same week, instead of repeating a prediction of the time information serving as the reference to calculate the positions of the plurality of GPS satellites.

However, Gaal again shows the limitations of the previously predicted WNa used as the time information with respect to the almanac which contains the time information indicating the second number lapsed from the head of a same week, instead of repeating a prediction of the time information serving as the reference to calculate the

positions of the plurality of GPS satellites. " The basis mechanism to use old data is to adjust the TOW or timestamp upon the transmission. If the TOW of the predicted subframe matches the current, then a valid prediction can be transmitted. If there is a mismatch, then that means the data is old, which can still be used as prediction, but the TOW and subsequently the CRC have to be updated" (column 7, paragraph 0015).

Therefore, it would have been obvious to teach the predicted subframes in the reference are used as the time information with respect to the almanac which contains the time information indicating the second number lapsed from the head of a same week.

Doing so would motivate the limitations of the previously predicted WNa used as the time information with respect to the almanac which contains the time information indicating the second number lapsed from the head of a same week, instead of repeating a prediction of the time information serving as the reference to calculate the positions of the plurality of GPS satellites.

Considering **claim 11**, respected to **claim 2**, Loomis fails to disclose the limitations of the time information indicating the second number lapsed from a head of a week stored in a subframe, in which the almanac is stored, of respective main frames of the navigation message.

However, Gaal successfully discloses the limitations of the time information indicating the second number lapsed from a head of a week stored in a subframe, in which the almanac is stored, of respective main frames of the navigation message. " The value of the TOW as received is saved in task P710. Next, the process determines

whether the subframe was an almanac subframe in task P720. If the received subframe is an almanac subframe, then the loop increment value is set to 125 in task P730. If the received subframe is not an almanac subframe, then the loop increment value is set to 5 in task P740" (column 7, paragraph 0120).

Therefore, it would have been obvious to one skill in the art that the second number lapsed from a head of a week is stored in a subframe because the loop increment value in the reference is set upon the determination of almanac subframes and the received value of the TOW.

Doing so would motivate the limitations of the time information indicating the second number lapsed from a head of a week stored in a subframe, in which the almanac is stored, of respective main frames of the navigation message.

Loomis also fail to disclose the previously predicted WNa used as the time information with respect to the almanac which contains the time information indicating the second number lapsed from the head of a same week, instead of repeating a prediction of the time information serving as the reference to calculate the positions of the plurality of GPS satellites.

However, Gaal again shows the limitations of the previously predicted WNa used as the time information with respect to the almanac which contains the time information indicating the second number lapsed from the head of a same week, instead of repeating a prediction of the time information serving as the reference to calculate the positions of the plurality of GPS satellites. " The basis mechanism to use old data is to adjust the TOW or timestamp upon the transmission. If the TOW of the predicted

subframe matches the current, then a valid prediction can be transmitted. If there is a mismatch, then that means the data is old, which can still be used as prediction, but the TOW and subsequently the CRC have to be updated" (column 7, paragraph 0015).

Therefore, it would have been obvious to teach the predicted subframes in the reference are used as the time information with respect to the almanac which contains the time information indicating the second number lapsed from the head of a same week.

Doing so would motivate the limitations of the previously predicted WNa used as the time information with respect to the almanac which contains the time information indicating the second number lapsed from the head of a same week, instead of repeating a prediction of the time information serving as the reference to calculate the positions of the plurality of GPS satellites.

5. Claims **3-6** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Loomis (U.S. patent # 6,225,945),** modified by **Gaal (U.S. Patent # 2002/0049536),** as applied to claims **1-2 and 11** above, and further in view of **Suwa et al. (U.S. patent # 5,931,890).**

Considering **claim 3**, respected to **claim 1,** Loomis, as modified by Gaal, disclose the limitations of the GPS receiver, further comprising a portion, predicting a Z count stored in respective subframes of the navigation message based on the current time which is calculated in the clock portion. " The time can be obtained from the real time clock 40 when the error in the approximate time from the real tome clock 40 is

expected to be small, preferably less than about a second, or from Z-count in the GPS signal" (column 6, column 38-42).

Loomis and Gall fail to disclose the limitations of a GPS receiver comprising a deciding portion, deciding that the restored almanac is abnormal when a difference between the predicted Z count and the Z count stored in the subframes of the navigation message exceeds a predetermined threshold value.

However, Suwa et al. successfully discloses the limitations of positioning system utilizing GPS satellites comprising a deciding portion that the restored almanac is abnormal when a difference between the predicted Z count and the Z count stored in the subframes of the navigation message exceeds a predetermined threshold value. " The content of Z-count indicates a predetermined timing when the leading end of the next subframe is to be transmitted, and this time is very accurate. Accordingly, a difference between the time when the leading end of the next subframe is detected on the receiving side and the time indicated by the Z-count is equivalent to the propagation time delay of the radio wave between the transmitting and the receiving point" (column 8, line 44-50), and An examination is then made to see if the rate of change ΔΔf exceeds a first threshold value 30Hz/s in order to determine if ΔΔf is an extraordinary value or not at step 14" (column 7, line 65-67)

Therefore, it would have been obvious to one skill in the art that the restored almanac is abnormal when a difference between the predicted Z count and the Z count stored in the subframes of the navigation message exceeds a predetermined threshold value because there is a relationship between frequency and time. Also, the

determination of ΔΔf based upon an extraordinary value is understood as the abnormal restored almanac.

Doing so would motivate the limitations of positioning system utilizing GPS satellites comprising a deciding portion that the restored almanac is abnormal when a difference between the predicted Z count and the Z count stored in the subframes of the navigation message exceeds a predetermined threshold value.

Considering **claim 3**, respected to **claim 2,** Loomis, as modified by Gaal, disclose the limitations of the GPS receiver, further comprising a portion, predicting a Z count stored in respective subframes of the navigation message based on the current time which is calculated in the clock portion. " The time can be obtained from the real time clock 40 when the error in the approximate time from the real tome clock 40 is expected to be small, preferably less than about a second, or from Z-count in the GPS signal" (column 6, column 38-42).

Loomis and Gall fail to disclose the limitations of a GPS receiver comprising a deciding portion, deciding that the restored almanac is abnormal when a difference between the predicted Z count and the Z count stored in the subframes of the navigation message exceeds a predetermined threshold value.

However, Suwa et al. successfully discloses the limitations of positioning system utilizing GPS satellites comprising a deciding portion that the restored almanac is abnormal when a difference between the predicted Z count and the Z count stored in the subframes of the navigation message exceeds a predetermined threshold value. " The content of Z-count indicates a predetermined timing when the leading end of the

next subframe is to be transmitted, and this time is very accurate. Accordingly, a difference between the time when the leading end of the next subframe is detected on the receiving side and the time indicated by the Z-count is equivalent to the propagation time delay of the radio wave between the transmitting and the receiving point" (column 8, line 44-50), and An examination is then made to see if the rate of change ΔΔf exceeds a first threshold value 30Hz/s in order to determine if ΔΔf is an extraordinary value or not at step 14" (column 7, line 65-67)

Therefore, it would have been obvious to one skill in the art that the restored almanac is abnormal when a difference between the predicted Z count and the Z count stored in the subframes of the navigation message exceeds a predetermined threshold value because there is a relationship between frequency and time. Also, the determination of ΔΔf based upon an extraordinary value is understood as the abnormal restored almanac.

Doing so would motivate the limitations of positioning system utilizing GPS satellites comprising a deciding portion that the restored almanac is abnormal when a difference between the predicted Z count and the Z count stored in the subframes of the navigation message exceeds a predetermined threshold value.

Considering **claim** 4, respected to **claim 3**, Loomis, as modified by Gaal, disclose the limitations of the GPS receiver, wherein the satellite position calculating portion includes a first satellite position calculating portion which calculates positions of the plurality of GPS satellites by using the almanac stored in the almanac storing portion, and a second satellite position calculating portion which calculates positions of

the plurality of GPS satellites by using the almanac which is restored on a basis of the predicted time information which serves as the reference to calculate the positions of the plurality of GPS satellites. " The GPS data bits are segmented into 1500 bit frames, also called pages, of thirty seconds. The frame in each GPS signals includes the ephemeris orbital parameters for the GPS transmitting that GPS signal and a portion of the almanac orbital parameters for all the GPS satellites" **(Loomis (6,225,945)**, column 4, line 17-21), "when current ephemeris data is not available, the GPS receiver uses GPS almanac data or old GPS ephemeris data, herein termed coarse satellite orbital parameters, for determining a user velocity and then integrating the user velocity from the last known location to obtain a first new location" **(Loomis (6,225,945),** column 3, line 25-30), and " when the GPS ephemeris data 42 is no longer current , the memory 20 includes program codes for data selector 51...The time can be obtained from the real time clock 40 when the error in the approximate time from the real time clock 40 is expected to be small, preferably less than about a second, or from a Z-count in the GPS signal" (**Loomis (6,225,945),** column 6, line 24-44).

It is well known to one skill in the art that the GPS almanac or old ephemeris data, which is used when the current GPS is not available, is understood as a first satellite position calculating portion which calculates positions of the plurality of GPS satellites by using the almanac stored in the almanac storing portion, and the method to updating the location as a last user location data in the memory is understood as a second satellite position calculating portion which calculates positions of the plurality of GPS satellites by using the almanac which is restored on a basis of the predicted time

information which serves as the reference to calculate the positions of the plurality of GPS satellites.

Loomis and Gaal fails to disclose the limitations of a GPS receiver comprising a deciding portion, deciding that the restored almanac is abnormal when a difference between the predicted Z count and the Z count stored in the subframes of the navigation message exceeds a predetermined threshold value.

Nevertheless, Suwa et al. successfully discloses the limitations of positioning system utilizing GPS satellites comprising a deciding portion that the restored almanac is abnormal when a difference between the predicted Z count and the Z count stored in the subframes of the navigation message exceeds a predetermined threshold value. " The content of Z-count indicates a predetermined timing when the leading end of the next subframe is to be transmitted, and this time is very accurate. Accordingly, a difference between the time when the leading end of the next subframe is detected on the receiving side and the time indicated by the Z-count is equivalent to the propagation time delay of the radio wave between the transmitting and the receiving point" (column 8, line 44-50), and An examination is then made to see if the rate of change ΔΔf exceeds a first threshold value 30Hz/s in order to determine if ΔΔf is an extraordinary value or not at step 14" (column 7, line 65-67)

Therefore, it would have been obvious to one skill in the art that the restored almanac is abnormal when a difference between the predicted Z count and the Z count stored in the subframes of the navigation message exceeds a predetermined threshold value because there is a relationship between frequency and time. Also, the

determination of ΔΔf based upon an extraordinary value is understood as the abnormal restored almanac.

Doing so would motivate the limitations of positioning system utilizing GPS satellites comprising a deciding portion that the restored almanac is abnormal when a difference between the predicted Z count and the Z count stored in the subframes of the navigation message exceeds a predetermined threshold value.

Considering **claim 5**, respected to **claim 1**, Loomis, as modified by Gaal, disclose the limitations of the GPS receiver, wherein the satellite position calculating portion includes a first satellite position calculating portion which calculates positions of the plurality of GPS satellites by using the ephemeris which is stored in the ephemeris storing portion, and a second satellite position calculating portion which calculates positions of the plurality of GPS satellites by using the almanac which is restored on a basis of the predicted time information which serves as the reference to calculate the positions of the plurality of GPS satellites. " During operation, the GPS navigation processing code 36 uses information in the GPS data bits for updating and storing the GPS ephemeris orbital parameters in the memory 20 as current GPS ephemeris data 42 and the GPS satellite almanac orbital parameters in the memory 20 as GPS almanac data" (**Loomis (6,225,945),** column 5, line 57-61), "when the GPS ephemeris data 42 is current, the GPS navigation processing code 36 uses the GPS ephemeris data 42, the code 36 uses the GPS ephemeris data 42, the code and carrier measurements, the timing of the GPS data bits, and the Z-counts for preferably four GPS satellites for determining location , velocity , and time of the GPS receiver 10 in a conventional

manner and updating the location as a last user location data 46 in the memory 20" (column 6,line 10-16).

It is well known to one skill in the art that the current GPS ephemeris data is understood as a first satellite position calculating portion which calculates positions of the plurality of GPS satellites by using the ephemeris stored in the ephemeris storing portion, and the method to updating the location as a last user location data in the memory is understood as a second satellite position calculating portion which calculates positions of the plurality of GPS satellites by using the almanac which is restored on a basis of the predicted time information which serves as the reference to calculate the positions of the plurality of GPS satellites.

Therefore, Loomis and Gaal successfully disclose the limitations as listed above.

Loomis and Gaal fails to disclose the limitations of a GPS receiver comprising a deciding portion, deciding that the restored almanac is abnormal when a difference between the predicted Z count and the Z count stored in the subframes of the navigation message exceeds a predetermined threshold value.

Nevertheless, Suwa et al. successfully discloses the limitations of positioning system utilizing GPS satellites comprising a deciding portion that the restored almanac is abnormal when a difference between the predicted Z count and the Z count stored in the subframes of the navigation message exceeds a predetermined threshold value. " The content of Z-count indicates a predetermined timing when the leading end of the next subframe is to be transmitted, and this time is very accurate. Accordingly, a difference between the time when the leading end of the next subframe is detected on

the receiving side and the time indicated by the Z-count is equivalent to the propagation time delay of the radio wave between the transmitting and the receiving point" (column 8, line 44-50), and An examination is then made to see if the rate of change $\Delta\Delta f$ exceeds a first threshold value 30Hz/s in order to determine if $\Delta\Delta f$ is an extraordinary value or not at step 14" (column 7, line 65-67).

Therefore, it would have been obvious to one skill in the art that the restored almanac is abnormal when a difference between the predicted Z count and the Z count stored in the subframes of the navigation message exceeds a predetermined threshold value because there is a relationship between frequency and time. Also, the determination of $\Delta\Delta f$ based upon an extraordinary value is understood as the abnormal restored almanac.

Doing so would motivate the limitations of positioning system utilizing GPS satellites comprising a deciding portion that the restored almanac is abnormal when a difference between the predicted Z count and the Z count stored in the subframes of the navigation message exceeds a predetermined threshold value.

Considering **claim 5**, respected to **claim 2**, Loomis, as modified by Gaal, disclose the limitations of the GPS receiver, wherein the satellite position calculating portion includes a first satellite position calculating portion which calculates positions of the plurality of GPS satellites by using the ephemeris which is stored in the ephemeris storing portion, and a second satellite position calculating portion which calculates positions of the plurality of GPS satellites by using the almanac which is restored on a basis of the predicted time information which serves as the reference to calculate the

positions of the plurality of GPS satellites. " During operation, the GPS navigation processing code 36 uses information in the GPS data bits for updating and storing the GPS ephemeris orbital parameters in the memory 20 as current GPS ephemeris data 42 and the GPS satellite almanac orbital parameters in the memory 20 as GPS almanac data" **(Loomis (6,225,945),** column 5, line 57-61), "when the GPS ephemeris data 42 is current, the GPS navigation processing code 36 uses the GPS ephemeris data 42, the code 36 uses the GPS ephemeris data 42, the code and carrier measurements, the timing of the GPS data bits, and the Z-counts for preferably four GPS satellites for determining location , velocity , and time of the GPS receiver 10 in a conventional manner and updating the location as a last user location data 46 in the memory 20" (column 6,line 10-16).

It is well known to one skill in the art that the current GPS ephemeris data is understood as a first satellite position calculating portion which calculates positions of the plurality of GPS satellites by using the ephemeris stored in the ephemeris storing portion, and the method to updating the location as a last user location data in the memory is understood as a second satellite position calculating portion which calculates positions of the plurality of GPS satellites by using the almanac which is restored on a basis of the predicted time information which serves as the reference to calculate the positions of the plurality of GPS satellites.

Therefore, Loomis and Gaal successfully disclose the limitations as listed above.

Loomis and Gaal fails to disclose the limitations of a GPS receiver comprising a deciding portion, deciding that the restored almanac is abnormal when a difference

between the predicted Z count and the Z count stored in the subframes of the navigation message exceeds a predetermined threshold value.

Nevertheless, Suwa et al. successfully discloses the limitations of positioning system utilizing GPS satellites comprising a deciding portion that the restored almanac is abnormal when a difference between the predicted Z count and the Z count stored in the subframes of the navigation message exceeds a predetermined threshold value. " The content of Z-count indicates a predetermined timing when the leading end of the next subframe is to be transmitted, and this time is very accurate. Accordingly, a difference between the time when the leading end of the next subframe is detected on the receiving side and the time indicated by the Z-count is equivalent to the propagation time delay of the radio wave between the transmitting and the receiving point" (column 8, line 44-50), and An examination is then made to see if the rate of change $\Delta\Delta f$ exceeds a first threshold value 30Hz/s in order to determine if $\Delta\Delta f$ is an extraordinary value or not at step 14" (column 7, line 65-67).

Therefore, it would have been obvious to one skill in the art that the restored almanac is abnormal when a difference between the predicted Z count and the Z count stored in the subframes of the navigation message exceeds a predetermined threshold value because there is a relationship between frequency and time. Also, the determination of $\Delta\Delta f$ based upon an extraordinary value is understood as the abnormal restored almanac.

Doing so would motivate the limitations of positioning system utilizing GPS satellites comprising a deciding portion that the restored almanac is abnormal when a

difference between the predicted Z count and the Z count stored in the subframes of the navigation message exceeds a predetermined threshold value.

Considering **claim 6**, respected to **claim 1,** Loomis, as modified by Gaal, disclose the limitations of the GPS receiver comprising a Doppler-shift frequency calculating portion, calculating Doppler-shift frequencies of signals received from the plurality of GPS satellites respectively. " The GPS signal processing code 34 measures and provides feedback adjustments for the frequency error in the reference clocking signal and correlate with the carrier frequencies of the Doppler frequency shifted incoming signal" (**Loomis (6,225,945),** column 5, line 17-21), but Loomis and Gaal fail to disclose the limitations of a Doppler-shift frequency predicting portion, predicting a Doppler-shift frequency by using the almanac which is restored by the restoring portion and a deciding portion, deciding that the restored almanac is abnormal when a difference between the Doppler-shift frequency predicted by the Doppler-shift frequency predicting portion and the Doppler-shift frequencies calculated by the Doppler-shift frequency calculating portion exceeds a predetermined threshold value.

However, Suwa et al. successfully discloses the limitations of positioning system utilizing GPS satellites, further comprising:

- A Doppler-shift frequency predicting portion, predicting a Doppler-shift frequency by using the almanac which is restored by the restoring portion. " A transmitting frequency f0 of the satellite of interest, which is commonly known as a nominal frequency, is also extracted from the Almanac data and saved in a register" (column 6, line 62-64).

- A deciding portion, deciding that the restored almanac is abnormal when a difference between the Doppler-shift frequency predicted by the Doppler-shift frequency predicting portion and the Doppler-shift frequencies calculated by the Doppler-shift frequency calculating portion exceeds a predetermined threshold value. "The content of Z-count indicates a predetermined timing when the leading end of the next subframe is to be transmitted, and this time is very accurate. Accordingly, a difference between the time when the leading end of the next subframe is detected on the receiving side and the time indicated by the Z-count is equivalent to the propagation time delay of the radio wave between the transmitting and the receiving point" (column 8, line 44-50), and An examination is then made to see if the rate of change $\Delta\Delta f$ exceeds a first threshold value 30Hz/s in order to determine if $\Delta\Delta f$ is an extraordinary value or not at step 14" (column 7, line 65-67).

Considering **claim 6**, respected to **claim 2,** Loomis, as modified by Gaal, disclose the limitations of the GPS receiver comprising a Doppler-shift frequency calculating portion, calculating Doppler-shift frequencies of signals received from the plurality of GPS satellites respectively. " The GPS signal processing code 34 measures and provides feedback adjustments for the frequency error in the reference clocking signal and correlate with the carrier frequencies of the Doppler frequency shifted incoming signal" (**Loomis (6,225,945),** column 5, line 17-21), but Loomis and Gaal fail to disclose the limitations of a Doppler-shift frequency predicting portion, predicting a Doppler-shift frequency by using the almanac which is restored by the restoring portion

and a deciding portion, deciding that the restored almanac is abnormal when a difference between the Doppler-shift frequency predicted by the Doppler-shift frequency predicting portion and the Doppler-shift frequencies calculated by the Doppler-shift frequency calculating portion exceeds a predetermined threshold value.

However, Suwa et al. successfully discloses the limitations of positioning system utilizing GPS satellites, further comprising:

- A Doppler-shift frequency predicting portion, predicting a Doppler-shift frequency by using the almanac which is restored by the restoring portion. " A transmitting frequency f0 of the satellite of interest, which is commonly known as a nominal frequency, is also extracted from the Almanac data and saved in a register" (column 6, line 62-64).
- A deciding portion, deciding that the restored almanac is abnormal when a difference between the Doppler-shift frequency predicted by the Doppler-shift frequency predicting portion and the Doppler-shift frequencies calculated by the Doppler-shift frequency calculating portion exceeds a predetermined threshold value. "The content of Z-count indicates a predetermined timing when the leading end of the next subframe is to be transmitted, and this time is very accurate. Accordingly, a difference between the time when the leading end of the next subframe is detected on the receiving side and the time indicated by the Z-count is equivalent to the propagation time delay of the radio wave between the transmitting and the receiving point" (column 8, line 44-50), and An examination is then made to see if the rate of change $\Delta\Delta f$

exceeds a first threshold value 30Hz/s in order to determine if $\Delta\Delta f$ is an extraordinary value or not at step 14" (column 7, line 65-67).

6. Claims **7-9** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Loomis (U.S. patent # 6,225,945),** further modified by **Suwa et al. (U.S. patent # 5,931,890),** as applied to claims **3-6** above, and further in view of **Pietila et el. (U.S. Patent # 2002/0027525**).

Considering **claim 7**, respected to **claim 3,** Loomis, as modified by Gaal and Suwa et al., disclose the limitations of the GPS receiver, further comprising:

- A first satellite position calculating portion, calculating the positions of the plurality of GPS satellites by using the almanac which is stored in the almanac storing portion. "When current ephemeris data is not available, the GPS receiver uses GPS almanac data or old GPS ephemeris data, herein termed coarse satellite orbital parameters, for determining a user velocity and then integrating the user velocity from the last known location to obtain a first new location" (**Loomis (6,225,945),** column 3, line 25-30).
- A second satellite position calculating portion, calculating positions of the plurality of GPS satellites respectively by using three almanacs which are restored based on the predicted time information (referred to as Wna hereinafter) which serves as the reference to calculate the positions of the plurality of GPS satellites and WNa-1 and WNa+1 which are obtained by adding/subtracting 1 to/from the WNa respectively. " The predicted subframe

is stored to the prediction buffer at the location corresponding to the same subframe of the following frame. Note that while this method is useful for providing predictions of subframes 1-3 after only 30 seconds, the almanac data of subframes 4 and 5 repeats only every super frame even in the absence of an update, and the information necessary to provide a prediction for the following frame may not generally be available" (**Gaal (2002/0049536),** column 6, paragraph 0017).

Therefore, it would have been obvious to one skill in the art that teaches the calculating positions of the plurality of GPS satellites respectively by using three almanacs which are restored based on the predicted time information because the almanac data of subframes in the reference are restored according to the predictions of three subframes.

Doing so would motivate the limitations of the GPS, wherein a second satellite position calculating portion, calculating positions of the plurality of GPS satellites respectively by using three almanacs which are restored based on the predicted time information (referred to as Wna hereinafter) which serves as the reference to calculate the positions of the plurality of GPS satellites and WNa-1 and WNa+1 which are obtained by adding/subtracting 1 to/from the WNa respectively.

Loomis, as further modified by Gaal and Suwa et al., fail to disclose the limitations of a deciding portion, deciding the almanac used to calculate a position, which is closest to a position of the GPS satellite calculated by the first satellite position

calculating portion, among three positions of the GPS satellite, which are calculated by the second satellite position calculating portion, as a valid almanac.

However, Pietila successfully discloses the limitations of a deciding portion, deciding the almanac used to calculate a position, which is closest to a position of the GPS satellite calculated by the first satellite position calculating portion, among three positions of the GPS satellite, which are calculated by the second satellite position calculating portion, as a valid almanac. See FIG.5. " The satellite with the index 16 is the satellite to be selected first. In a corresponding manner, the value for the first element on the second level is the first element on row 16, i.e. the satellite SV1 is closest to the satellite SV16" (column 3, paragraph 0033), " in the positioning system, the position of each satellite at different moments of time can be determined on the basis of almanac data" (column 3, paragraph 0027).

Therefore, it would have been obvious to one skill in the art that the position of satellites are calculated based on the almanac data, and the second satellite is the closest to a position of the first satellite.

Doing so would motivate the limitations of a deciding portion, deciding the almanac used to calculate a position, which is closest to a position of the GPS satellite calculated by the first satellite position calculating portion, among three positions of the GPS satellite, which are calculated by the second satellite position calculating portion, as a valid almanac.

Considering **claim 8**, respected to **claim 1,** Loomis, as modified by Gaal, disclose the limitations of the GPS receiver, further comprising:

- A first satellite position calculating portion, calculating the positions of the plurality of GPS satellites by using the almanac which is stored in the almanac storing portion. "When current ephemeris data is not available, the GPS receiver uses GPS almanac data or old GPS ephemeris data, herein termed coarse satellite orbital parameters, for determining a user velocity and then integrating the user velocity from the last known location to obtain a first new location" **(Loomis (6,225,945),** column 3, line 25-30).
- A second satellite position calculating portion, calculating positions of the plurality of GPS satellites respectively by using three almanacs which are restored based on the predicted time information (referred to as Wna hereinafter) which serves as the reference to calculate the positions of the plurality of GPS satellites and WNa-1 and WNa+1 which are obtained by adding/subtracting 1 to/from the WNa respectively. " The predicted subframe is stored to the prediction buffer at the location corresponding to the same subframe of the following frame. Note that while this method is useful for providing predictions of subframes 1-3 after only 30 seconds, the almanac data of subframes 4 and 5 repeats only every super frame even in the absence of an update, and the information necessary to provide a prediction for the following frame may not generally be available" **(Gaal (2002/0049536),** column 6, paragraph 0107).

Therefore, it would have been obvious to one skill in the art that teaches the calculating positions of the plurality of GPS satellites respectively by using three

almanacs which are restored based on the predicted time information because the almanac data of subframes in the reference according to the predictions of three subframes.

Doing so would motivate the limitations of the GPS, wherein A second satellite position calculating portion, calculating positions of the plurality of GPS satellites respectively by using three almanacs which are restored based on the predicted time information (referred to as Wna hereinafter) which serves as the reference to calculate the positions of the plurality of GPS satellites and WNa-1 and WNa+1 which are obtained by adding/subtracting 1 to/from the WNa respectively.

Loomis, as further modified by Gaal and Suwa et al., fail to disclose the limitations of a deciding portion, deciding the almanac used to calculate a position, which is closest to a position of the GPS satellite calculated by the first satellite position calculating portion, among three positions of the GPS satellite, which are calculated by the second satellite position calculating portion, as a valid almanac.

However, Pietila successfully discloses the limitations of a deciding portion, deciding the almanac used to calculate a position, which is closest to a position of the GPS satellite calculated by the first satellite position calculating portion, among three positions of the GPS satellite, which are calculated by the second satellite position calculating portion, as a valid almanac. See FIG.5. " The satellite with the index 16 is the satellite to be selected first. In a corresponding manner, the value for the first element on the second level is the first element on row 16, i.e. the satellite SV1 is closest to the satellite SV16" (column 3, paragraph 0033), " in the positioning system,

the position of each satellite at different moments of time can be determined on the basis of almanac data" (column 3, paragraph 0027).

Therefore, it would have been obvious to one skill in the art that the position of satellites are calculated based on the almanac data, and the second satellite is the closest to a position of the first satellite.

Doing so would motivate the limitations of a deciding portion, deciding the almanac used to calculate a position, which is closest to a position of the GPS satellite calculated by the first satellite position calculating portion, among three positions of the GPS satellite, which are calculated by the second satellite position calculating portion, as a valid almanac.

Considering **claim 8**, respected to **claim 2,** Loomis, as modified by Gaal, disclose the limitations of the GPS receiver, further comprising:

- A first satellite position calculating portion, calculating the positions of the plurality of GPS satellites by using the almanac which is stored in the almanac storing portion. "When current ephemeris data is not available, the GPS receiver uses GPS almanac data or old GPS ephemeris data, herein termed coarse satellite orbital parameters, for determining a user velocity and then integrating the user velocity from the last known location to obtain a first new location" **(Loomis (6,225,945),** column 3, line 25-30).
- A second satellite position calculating portion, calculating positions of the plurality of GPS satellites respectively by using three almanacs which are restored based on the predicted time information (referred to as Wna

hereinafter) which serves as the reference to calculate the positions of the plurality of GPS satellites and WNa-1 and WNa+1 which are obtained by adding/subtracting 1 to/from the WNa respectively. " The predicted subframe is stored to the prediction buffer at the location corresponding to the same subframe of the following frame. Note that while this method is useful for providing predictions of subframes 1-3 after only 30 seconds, the almanac data of subframes 4 and 5 repeats only every super frame even in the absence of an update, and the information necessary to provide a prediction for the following frame may not generally be available" (**Gaal (2002/0049536),** column 6, paragraph 0107).

Therefore, it would have been obvious to one skill in the art that teaches the calculating positions of the plurality of GPS satellites respectively by using three almanacs which are restored based on the predicted time information because the almanac data of subframes in the reference according to the predictions of three subframes.

Doing so would motivate the limitations of the GPS, wherein A second satellite position calculating portion, calculating positions of the plurality of GPS satellites respectively by using three almanacs which are restored based on the predicted time information (referred to as Wna hereinafter) which serves as the reference to calculate the positions of the plurality of GPS satellites and WNa-1 and WNa+1 which are obtained by adding/subtracting 1 to/from the WNa respectively.

Loomis, as further modified by Gaal and Suwa et al., fail to disclose the limitations of a deciding portion, deciding the almanac used to calculate a position, which is closest to a position of the GPS satellite calculated by the first satellite position calculating portion, among three positions of the GPS satellite, which are calculated by the second satellite position calculating portion, as a valid almanac.

However, Pietila successfully discloses the limitations of a deciding portion, deciding the almanac used to calculate a position, which is closest to a position of the GPS satellite calculated by the first satellite position calculating portion, among three positions of the GPS satellite, which are calculated by the second satellite position calculating portion, as a valid almanac. See FIG.5. " The satellite with the index 16 is the satellite to be selected first. In a corresponding manner, the value for the first element on the second level is the first element on row 16, i.e. the satellite SV1 is closest to the satellite SV16" (column 3, paragraph 0033), " in the positioning system, the position of each satellite at different moments of time can be determined on the basis of almanac data" (column 3, paragraph 0027).

Therefore, it would have been obvious to one skill in the art that the position of satellites are calculated based on the almanac data, and the second satellite is the closest to a position of the first satellite.

Doing so would motivate the limitations of a deciding portion, deciding the almanac used to calculate a position, which is closest to a position of the GPS satellite calculated by the first satellite position calculating portion, among three positions of the

GPS satellite, which are calculated by the second satellite position calculating portion, as a valid almanac.

Considering **claim 9**, respected to **claim 1,** Loomis, as modified by Gaal and Suwa et al., disclose the limitations of the GPS receiver, further comprising:

- A Doppler-shift frequency calculating portion, calculating Doppler-shift frequencies of signals received from the plurality of GPS satellites respectively. " The GPS signal processing code 34 measures and provides feedback adjustments for the frequency error in the reference clocking signal and correlate with the carrier frequencies of the Doppler frequency shifted incoming signal" (**Loomis (6,225,945),** column 5, line 17-21)
- A Doppler-shift frequency predicting portion, predicting three Doppler-shift frequencies respectively by using three almanacs which are restored based on the predicted time information (referred to as Wna hereinafter) which serves as the reference to calculate the positions of the plurality of GPS satellites, and WNa-1 and WNa+l which are obtained by adding/subtracting 1 to/from the WNa respectively. " The predicted subframe is stored to the prediction buffer at the location corresponding to the same subframe of the following frame. Note that while this method is useful for providing predictions of subframes 1-3 after only 30 seconds, the almanac data of subframes 4 and 5 repeats only every super frame even in the absence of an update, and the information necessary to provide a prediction for the following frame may not generally be available" (**Gaal (2002/0049536),** column 6, paragraph 0107).

Therefore, it would have been obvious to one skill in the art that teaches the calculating positions of the plurality of GPS satellites respectively by using three almanacs which are restored based on the predicted time information because the almanac data of subframes in the reference according to the predictions of three subframes.

Doing so would motivate the limitations of the GPS, wherein a Doppler-shift frequency predicting portion, predicting three Doppler-shift frequencies respectively by using three almanacs which are restored based on the predicted time information (referred to as Wna hereinafter) which serves as the reference to calculate the positions of the plurality of GPS satellites, and WNa-1 and WNa+l which are obtained by adding/subtracting 1 to/from the WNa respectively.

Loomis, as further modified by Gaal and Suwa et al., fail to disclose the limitations of a deciding portion, deciding the almanac used to predict the Doppler-shift frequency, which is closest to the Doppler-shift frequency calculated by the Doppler-shift frequency calculating portion, among the three Doppler- shift frequencies, which are predicted by the Doppler-shift frequency predicting portion, as a valid almanac.

However, Pietila successfully discloses the limitations of a deciding portion, deciding the almanac used to predict the Doppler-shift frequency, which is closest to the Doppler-shift frequency calculated by the Doppler-shift frequency calculating portion, among the three Doppler- shift frequencies, which are predicted by the Doppler-shift frequency predicting portion, as a valid almanac. See FIG.5. " The satellite with the index 16 is the satellite to be selected first. In a corresponding manner, the value for the

first element on the second level is the first element on row 16, i.e. the satellite SV1 is closest to the satellite SV16" (column 3, paragraph 0033), " in the positioning system, the position of each satellite at different moments of time can be determined on the basis of almanac data" (column 3, paragraph 0027).

Therefore, it would have been obvious to one skill in the art that the almanac used to predict the Doppler-shift frequency, which is closest to the Doppler-shift frequency calculated by the Doppler-shift frequency calculating portion because there is the relationship between time and frequency. Moreover, the reference determines the closest second satellite upon a position of the first satellite and time.

Doing so would motivate the limitations of deciding portion, deciding the almanac used to predict the Doppler-shift frequency, which is closest to the Doppler-shift frequency calculated by the Doppler-shift frequency calculating portion, among the three Doppler- shift frequencies, which are predicted by the Doppler-shift frequency predicting portion, as a valid almanac.

Considering **claim 9**, respected to **claim 2,** Loomis, as modified by Gaal and Suwa et al., disclose the limitations of the GPS receiver, further comprising:

- A Doppler-shift frequency calculating portion, calculating Doppler-shift frequencies of signals received from the plurality of GPS satellites respectively. " The GPS signal processing code 34 measures and provides feedback adjustments for the frequency error in the reference clocking signal and correlate with the carrier frequencies of the Doppler frequency shifted incoming signal" **(Loomis (6,225,945),** column 5, line 17-21)

- A Doppler-shift frequency predicting portion, predicting three Doppler-shift frequencies respectively by using three almanacs which are restored based on the predicted time information (referred to as Wna hereinafter) which serves as the reference to calculate the positions of the plurality of GPS satellites, and WNa-1 and WNa+l which are obtained by adding/subtracting 1 to/from the WNa respectively. " The predicted subframe is stored to the prediction buffer at the location corresponding to the same subframe of the following frame. Note that while this method is useful for providing predictions of subframes 1-3 after only 30 seconds, the almanac data of subframes 4 and 5 repeats only every super frame even in the absence of an update, and the information necessary to provide a prediction for the following frame may not generally be available" **(Gaal (2002/0049536),** column 6, paragraph 0107).

Therefore, it would have been obvious to one skill in the art that teaches the calculating positions of the plurality of GPS satellites respectively by using three almanacs which are restored based on the predicted time information because the almanac data of subframes in the reference according to the predictions of three subframes.

Doing so would motivate the limitations of the GPS, wherein a Doppler-shift frequency predicting portion, predicting three Doppler-shift frequencies respectively by using three almanacs which are restored based on the predicted time information (referred to as Wna hereinafter) which serves as the reference to calculate the positions

of the plurality of GPS satellites, and WNa-1 and WNa+l which are obtained by adding/subtracting 1 to/from the WNa respectively.

Loomis, as further modified by Gaal and Suwa et al., fail to disclose the limitations of a deciding portion, deciding the almanac used to predict the Doppler-shift frequency, which is closest to the Doppler-shift frequency calculated by the Doppler-shift frequency calculating portion, among the three Doppler- shift frequencies, which are predicted by the Doppler-shift frequency predicting portion, as a valid almanac.

However, Pietila successfully discloses the limitations of a deciding portion, deciding the almanac used to predict the Doppler-shift frequency, which is closest to the Doppler-shift frequency calculated by the Doppler-shift frequency calculating portion, among the three Doppler- shift frequencies, which are predicted by the Doppler-shift frequency predicting portion, as a valid almanac. See FIG.5. " The satellite with the index 16 is the satellite to be selected first. In a corresponding manner, the value for the first element on the second level is the first element on row 16, i.e. the satellite SV1 is closest to the satellite SV16" (column 3, paragraph 0033), " in the positioning system, the position of each satellite at different moments of time can be determined on the basis of almanac data" (column 3, paragraph 0027).

Therefore, it would have been obvious to one skill in the art that the almanac used to predict the Doppler-shift frequency, which is closest to the Doppler-shift frequency calculated by the Doppler-shift frequency calculating portion because there is the relationship between time and frequency. Moreover, the reference determines the closest second satellite upon a position of the first satellite and time.

Doing so would motivate the limitations of deciding portion, deciding the almanac used to predict the Doppler-shift frequency, which is closest to the Doppler-shift frequency calculated by the Doppler-shift frequency calculating portion, among the three Doppler- shift frequencies, which are predicted by the Doppler-shift frequency predicting portion, as a valid almanac

7. Claim **10** is rejected under 35 U.S.C. 103(a) as being unpatentable over **Loomis (U.S. patent # 6,225,945),** further modified by **Pietila et el. (U.S. Patent # 2002/0027525)**, as applied to claims **7-9** above, and further in view of **Abraham et al. (U.S. Patent # 5,731,786).**

Considering **claim 10**, respected **claim 1,** Loomis, as modified by Gaal, disclose the limitations of the GPS receiver, further comprising:

- A time calculating portion, calculating a time based on the predicted time information which serves as the reference to calculate the positions of the plurality of GPS satellites and time information stored in respective main frames of the navigation message to indicate a second number lapsed from a head of a week. " The basic mechanism to use old data is to adjust the TOW or timestamp upon the transmission. If the TOW of the predicted time subframe matches the current, then a valid prediction can be transmitted. If there is a mismatch, then that means the data is old, which can still be prediction, but the TOW and subsequently the CRC have to be updated" (**Gaal (2002/0049536),** column 7, paragraph 0114), and in this embodiment,

> when the TOW approaches its maximum value, we know that a week change follows. That is, when the predicted TOW indicates a week change, the TOW value is corrected and the week number in word 3 of subframe 1 is incremented" (**Gaal (2002/0049536),** column 7, paragraph 0115).

Therefore, it would have been obvious to one skill in the art that the TOW of the predicted time subframes in the reference matches the current time to calculate the positions of the plurality of GPS satellites and time information stored in respective main frames.

Doing so would motivate the limitations of a time calculating portion, calculating a time based on the predicted time information which serves as the reference to calculate the positions of the plurality of GPS satellites and time information stored in respective main frames of the navigation message to indicate a second number lapsed from a head of a week.

Loomis, as modified by Gaal, fail to disclose the limitations of a correcting portion, correcting the predicted time information which serves as the reference to calculate the positions of the plurality of GPS satellites such that the time calculated by the time calculating portion is below 3.5 days rather than the current time calculated by the clock portion.

However, Abraham et al. successfully disclose the limitations of a correcting portion, correcting the predicted time information which serves as the reference to calculate the positions of the plurality of GPS satellites such that the time calculated by the time calculating portion is below 3.5 days rather than the current time calculated by

the clock portion. " The almanac reference time t_{OS} is normally stated in multiples of 212 seconds, truncated from a time 3.5 days after the first valid transmission time for the almanac data set. The almanac data are updated often enough so that the GPS time differs from t_{OS} by less than 3.5 days during a transmission interval" (column 13, line 26-33).

Therefore, it would have been obvious to teach the time calculated by the time calculating portion is below 3.5 days rather than the current time calculated by the clock portion because the almanac data in the reference are updated often enough so that the GPS time differs from t_{OS} by less than 3.5 days during a transmission interval.

Doing so would motivate the limitations of a correcting portion, correcting the predicted time information which serves as the reference to calculate the positions of the plurality of GPS satellites such that the time calculated by the time calculating portion is below 3.5 days rather than the current time calculated by the clock portion.

Considering **claim 10**, respected **claim 2,** Loomis, as modified by Gaal, disclose the limitations of the GPS receiver, further comprising:

- A time calculating portion, calculating a time based on the predicted time information which serves as the reference to calculate the positions of the plurality of GPS satellites and time information stored in respective main frames of the navigation message to indicate a second number lapsed from a head of a week. " The basic mechanism to use old data is to adjust the TOW or timestamp upon the transmission. If the TOW of the predicted time subframe matches the current, then a valid prediction can be transmitted. If

there is a mismatch, then that means the data is old, which can still be prediction, but the TOW and subsequently the CRC have to be updated" (**Gaal (2002/0049536),** column 7, paragraph 0114), and in this embodiment, when the TOW approaches its maximum value, we know that a week change follows. That is, when the predicted TOW indicates a week change, the TOW value is corrected and the week number in word 3 of subframe 1 is incremented" (**Gaal (2002/0049536),** column 7, paragraph 0115).

Therefore, it would have been obvious to one skill in the art that the TOW of the predicted time subframes in the reference matches the current time to calculate the positions of the plurality of GPS satellites and time information stored in respective main frames.

Doing so would motivate the limitations of a time calculating portion, calculating a time based on the predicted time information which serves as the reference to calculate the positions of the plurality of GPS satellites and time information stored in respective main frames of the navigation message to indicate a second number lapsed from a head of a week.

Loomis, as modified by Gaal, fail to disclose the limitations of a correcting portion, correcting the predicted time information which serves as the reference to calculate the positions of the plurality of GPS satellites such that the time calculated by the time calculating portion is below 3.5 days rather than the current time calculated by the clock portion.

However, Abraham et al. successfully disclose the limitations of a correcting portion, correcting the predicted time information which serves as the reference to calculate the positions of the plurality of GPS satellites such that the time calculated by the time calculating portion is below 3.5 days rather than the current time calculated by the clock portion. " The almanac reference time t_{OS} is normally stated in multiples of 212 seconds, truncated from a time 3.5 days after the first valid transmission time for the almanac data set. The almanac data are updated often enough so that the GPS time differs from t_{OS} by less than 3.5 days during a transmission interval" (column 13, line 26-33).

Therefore, it would have been obvious to teach the time calculated by the time calculating portion is below 3.5 days rather than the current time calculated by the clock portion because the almanac data in the reference are updated often enough so that the GPS time differs from t_{OS} by less than 3.5 days during a transmission interval.

Doing so would motivate the limitations of a correcting portion, correcting the predicted time information which serves as the reference to calculate the positions of the plurality of GPS satellites such that the time calculated by the time calculating portion is below 3.5 days rather than the current time calculated by the clock portion.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hien Le whose telephone number is 571-270-1326. The examiner can normally be reached on M-F: 7:30am- 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Terrell McKinnon can be reached on 571-272-4797. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Patent Examiner

Hien Le
December 12, 2006

TERRELL L. MCKINNON
SUPERVISORY PATENT EXAMINER